REMARKS

Introduction

Claims 4 and 8-10 are pending, of which claims 1 and 4 are independent. Withdrawn claims 1-3 have been cancelled without prejudice.

Claim 4 has been amended to correct informalities in the claim language and to more clearly define the present subject matter. Claims 8-10 have been added. Claims 5-7 have been cancelled without prejudice. Support for the amendment and the new claims is found, for example, at FIGS. 1 and 3C and page 14, lines 7-11 of the specification. Care has been taken to avoid introducing new matter.

Claim Rejection - 35 U.S.C. §112, second paragraph

Claims 4-6 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicants respectfully submit that the amendment made to claim 4 overcomes this rejection.

Claim Rejections - 35 U.S.C. §103

Claims 4-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Maeda et al. (US 6,189,771) in view of Mei (US 6,680,128) and further in view of the collective teachings of Kodas (US 6,951,666) and Kang et al (US 5,837,119). These rejections are traversed for at least the following reasons.

Applicants respectfully submit that claim 4 would not have been obvious over the cited references because none of the cited references recognize or even suggest the migration problem which Applicants have found, and therefore there is no basis to make the proposed modification absent reference to Applicants' specification, which is impermissible. Applicants note that that

only Applicants have discovered the source of the problems associated with migration of metal powder included in the soldering paste (see, page 2, lines 10-17 and page 13, lines 1-9 of the specification). In the present application, a flake-like shaped metal powder includes a core metal and a surface metal covering a surface of the core metal, and the surface metal has a melting point higher than that of the solder, thereby producing no oxide film on the surfaces of metal powder in the atmosphere and obtaining excellent wettability for solder (see, page 6, line 22 to page 7, line 1 of the specification). The core metal is made of metal capable of taking in the surface metal under solution heat in the reflow process. With these features, even when a gap is created between the bump (i.e., solder portion) and the circuit electrode (i.e., second electrode) of the substrate due to deformation of electronic parts or variant sizes of bumps, it is possible to prevent a defective mounting in which the bumps are not reliably soldered to circuit electrodes. It is also possible to obtain excellent insulation effect (i.e., oxide film) (see, page 13, lines 11-16 of the specification). Accordingly, in the present disclosure, the migration problem after soldering can be effectively prevented (see, page 3, lines 17-23 and page 13, lines 11-16 of the specification).

In contrast, Applicants submit that none of references recognize or even suggest the migration problem caused by the metal powder. For example, Maeda does not disclose or even suggest a configuration of the metal powder for preventing a generation of migration. Since Maeda utilizes a metal paste inside of concave portion 3, a migration problem would not occur, and thus Maeda does not need to employ a coated metal powder for preventing a generation of migration. Mei utilizes a soldering paste in a different way from the present subject matter because Mei fails to recognize the migration problem. In Mei, the solder paste performs a soldering by melting itself, and thus is not intended to help another molten solder's soldering

process. In addition, Mei describes that surface metals include copper and tin, which are not expected to have effects of wetting and spreading the molten solder along surfaces of the metal powder guiding the molten solder. Mei also discloses that the coating material may be selected from polymers (not metal) (see, column 3, line 64 to column 4, line 3 of Mei). In other words, Mei is not directed to the method in which a feature fluidized solder can easily wet and spread along surfaces of the metal powder. Further Mei fails to disclose or suggest a relation between a surface metal and a core metal for preventing a generation of migration. As such, it is clear that Mei fails to disclose the migration problem caused by the metal powder as disclosed by the present application.

Kodas is directed to a conductive adhesive which connects between metal particles as an electric conductive material. Thus, a process of melting a metal and solidifying the molten metal is not involved. The Examiner asserts that "since Kodas teaches the use of metal powder that have a flaky form with very large aspect ratios to form better electrical conduction, it is obvious to one of ordinary skill in the art to modify the method of Maeda in view of reference to use flake-like metal powder." Applicants, however, submit that the electrical conduction in the present subject matter, as well as in Mei and Maeda, is obtained by solidifying a molten solder (i.e., melted metal powder). In other words, metal powder does not maintain its original shape after soldering. In particular, the metal powder loses its original shape and is included in a lump of connection part. Accordingly, an initial shape of the metal powder is not a dominant factor on the electrical conduction. In contrast, in the present subject matter, the flake-like shaped metal powder is utilized to let molten solder wet and spread along the surfaces of the metal powder. The use of a flake-like shaped metal powder is not for obtaining a better electrical conduction. As such, it is clear that Kodas fails to recognize or even suggest the aforementioned migration

problem. Similarly, Kang is also directed to a conductive adhesive which utilizes a conductive metal. The metal is characterized in that a surface of dentlide shaped copper is plated. Kang does not disclose the claimed metal powder, and fails to disclose the aforementioned migration problem.

As such, one of skill in the art would not have been motivated to combine and modify the cited references to arrive at the subject matter of claim 4 without looking into the problems disclosed by the present application, which is clearly impermissible. **In this regard, it should be noted that a "patentable invention may lie in the discovery of the source of a problem *even though the remedy may be obvious once the source of the problem is identified*," *In re Sponnoble*, 160 USPQ 237, 243 (CCPA 1969)**.

Applicants further submit that, at a minimum, none of the cited references disclose or suggest that "*in the step (d), the soldered portion is uniformly formed by the solder portion and most of the metal powder included in the soldering paste for coating in the step (a)*," as recited by amended claim 4. In the present disclosure, as shown in, for example, FIG., 3C, the metal powder is uniformly included in the formed soldered potion. None of the cited references disclose or suggest such a feature of amended claim 4.

Based on the foregoing, Applicants respectfully submit that claim 4 is patentable over the cited references. Thus, it is requested that the Examiner withdraw the rejection of claim 4 under 35 U.S.C. § 103.

New Claims

Since new claims 8-10 depend upon claim 4, and none of the cited references disclose or suggest the features of these claims, claims 8-10 are patentable over the cited references.

Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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